

Amendments to the Claims:

Please amend claims 1, 15, 21-23, 25, and 27-30, all as shown below.

All pending claims are reproduced below, including those that remain unchanged.

Claim 1 (Currently amended): A method for shaping surfaces, comprising:

creating an annular plasma [having an energy input zone];

injecting a flow of reactive species into the annulus of the annular plasma [such that the reactive species dissociates primarily past the energy input zone]; and

using reactive atom plasma processing for the damage-free shaping of a surface.

Claim 2 (Original): The method of claim 1 wherein the process is carried out at about atmosphere temperature.

Claim 3 (Original): The method of claim 1 for shaping optical elements.

Claim 4 (Original): The method of claim 1 for shaping elements out of silicon.

Claim 5 (Original): The method of claim 1 for shaping silica glass optics.

Claim 6 (Original): The method of claim 1 for shaping aspheric optics.

Claim 7 (Original): The method of claim 1 operating in a subtractive manner.

Claim 8 (Original): The method of claim 1 that does not leave behind a contaminated redeposition layer.

Claim 9 (Original): The method of claim 1 using a plume of plasma.

Claim 10 (Original): The method of claim 1 using a plume of plasma operating as a sub-aperture tool.

Claim 11 (Original): The method of claim 1 wherein a plume of plasma is translated across a workpiece.

Claim 12 (Original): The method of claim 1 wherein the emission spectrum is monitored to determine process rates.

Claim 13 (Original): The method of claim 1 using carbon tetrafluoride (CF₄) in argon to create the plasma.

Claim 14 (Original): The method of claim 1 using C₂F₆ in argon to create the plasma.

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Claim 15 (Currently amended): The method of claim 1 using [silicon] sulfur hexafluoride (SF₆) in argon to create the plasma.

Claim 16 (Canceled).

Claim 17 (Canceled).

Claim 18 (Original): The method of claim 1 operating an additive manner.

Claim 19 (Previously amended): The method of claim 1 for removing damage introduced by previous process steps.

Claim 20 (Original): The method of claim 1 for removing surface roughness.

Claim 21 (Currently amended): A method for shaping surfaces, comprising:

injecting a flow of reactive species into the annulus of an annular plasma; and

using reactive atom plasma processing to shape and polish a surface.

Claim 22 (Currently amended): A method for shaping surfaces, comprising:

injecting a flow of reactive species into the annulus of an annular plasma; and

using reactive atom plasma processing for the damage-free shaping of a surface at about atmospheric pressure.

Claim 23 (Currently amended): A method for shaping surfaces, comprising:

using reactive atom plasma processing for the damage-free shaping of a surface;

wherein said using step includes using a flow of auxiliary gas to effect a flow of reactive gas before the reactive gas [contacts the] is injected into the annulus of an annular plasma.

Claim 24 (Previously presented): A method for shaping surfaces, comprising:

generating an annular plasma;

injecting a flow of reactive gas into the center of the annular plasma; and

using reactive atom plasma processing to shape a surface at about atmospheric pressure.

Claim 25 (Currently amended): A method for shaping surfaces, comprising:

creating an annular plasma having a central zone;

injecting a reactive species into the central zone of the annular plasma [such that the reactive species dissociates after entering the plasma]; and

using reactive atom plasma processing for the damage-free shaping of a surface.

Claim 26 (Previously presented): A method for shaping surfaces, comprising:

creating a plasma a distance from the tip of a plasma torch, the plasma having a skin;
injecting a flow of reactive gas through the skin of the plasma such that the reactive species begins to dissociate; and
using reactive atom plasma processing for the damage-free shaping of a surface.

Claim 27 (Currently amended): A method for shaping surfaces, comprising:

creating a torroidal plasma [having an energy input zone];
injecting a reactive species into center of the torroidal plasma [such that the reactive species dissociates primarily past the energy input zone]; and
using reactive atom plasma processing for the damage-free shaping of a surface.

Claim 28 (Currently amended): A method for shaping surfaces, comprising:

injecting a flow of reactive species into the annulus of an annular plasma; and
using reactive atom plasma processing to shape and finish a surface.

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Claim 29 (Currently amended): A method for shaping surfaces, comprising:

injecting a flow of reactive species into the annulus of an annular plasma; and
using reactive atom plasma processing to shape a surface while reducing the surface roughness.

Claim 30 (Currently amended): A method for shaping surfaces, comprising:

injecting a flow of reactive gas into the annulus of an annular plasma; and
using reactive atom plasma processing for the damage-free shaping of a surface;
wherein said using step includes using a flow of auxiliary gas to [effect the temperature of a flow of] keep heat from the annular plasma away from the reactive gas before the reactive gas contacts the plasma.

Claim 31 (Previously presented): A method for shaping surfaces, comprising:

generating an annular plasma;

injecting a flow of reactive gas into the center of the annular plasma; and

using reactive atom plasma processing to shape a surface.

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